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## (54) PIGMENT-COATED PAPER FOR PRINTING AND ITS PRODUCTION

### (57)Abstract:

PURPOSE: To obtain pigment-coated paper for printing, being lightweight, excellent in ink gloss and printing resistance and high in printing opacity and stiffness.

CONSTITUTION: The pigment-coated paper is obtained by applying a coating liquid containing 10-100 pts.wt. binder based on 100 pts.wt. total amount of pigments and containing 20-100 pts.wt. pigment having  $\leq 50$ ml/g oil absorption to base paper using a gate roll coater and then subjecting the coated paper to calendering treatment so as to keep the density to  $\leq 0.90$ .

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## CLAIMS

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### [Claim(s)]

[Claim 1] Pigment coated paper for printing characterized by applying the coating liquid which is made to carry out 10-100 weight section content of the binder to the total amount 100 weight section of this pigment, and carries out 20-100 weight section content of the pigment whose oil absorption of this pigment is 50ml / 100g or less in the pigment coated paper for printing which comes to apply the coating liquid which uses a pigment as a principal component in the Hara paper.

[Claim 2] The manufacture approach of the pigment coated paper for printing according to claim 1 characterized by making after spreading by the gate roll coater, and making this coating liquid into 0.90 or less consistency by calender processing in the manufacture approach of the pigment coated paper for printing which comes to apply the coating liquid which uses a pigment as a principal component in the Hara paper.

## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the pigment coated paper for printing which applied the coating liquid containing a pigment to the band-like stencil paper which carries out continuation transit, and its manufacture approach.

[0002]

[Description of the Prior Art] From before, pigment coated paper has smooth nature and high gloss as compared with non-applied paper of fine quality, and since the absorptivity of ink is uniform, it is used as a print sheet. Especially visualization of recent years and printed matter progresses, the demand to a print sheet is also diversified, further, a printing method is also crossed to varieties, such as gravure, rotary offset, and sheet offset, and development of a print sheet with the property which suited each printing method is progressing.

[0003] On the other hand, after going into the low-growth age in recent years, in the coat paper of A grade, low \*\*\*\*\* is prodigal with lightweight-izing and low-cost-izing of a print sheet, and - DODAUN is advancing quickly. The demand to the print sheet which performs pigment spreading in such a situation is excelling in ink gloss and print durability, and obtaining a product with whenever [ printing opacity (ink should not fall out at the rear face) and whenever / upright / still higher ] under high productivity.

[0004] However, if especially reduction of the amount of coating is made into two or less 10 g/m by both sides, it will cause aggravation of a printability, and the fall of printing opacity. For this reason, although much proposals, such as using a atomization pigment (for example, JP,4-9236,B) and a high oil absorption nature pigment (for example, JP,4-9237,B) for fall prevention of a printability, especially ink gloss, or using a plastics pigment (for example, JP,3-294593,A and 3-294595), are made, the present condition is that what can still be satisfied is not obtained.

[0005]

[Problem(s) to be Solved by the Invention] The purpose of this invention is excelling in a light weight, ink gloss, and print durability, and obtaining the pigment coated paper for

printing with whenever [ printing opacity and whenever / upright / still higher ].

[0006]

[Means for Solving the Problem] For this invention, it sets to the pigment coated paper for printing which comes to prepare the spreading layer which uses a pigment as a principal component, and its manufacture approach, and the coating liquid of this spreading layer is the total amount 100 weight section (with the weight section, hereafter) of this pigment. Receive pointing out the addition weight section at the time of making the grand total of a pigment into the 100 weight sections, and 10-100 weight section content of the binder is carried out. And it is reached by making after spreading by the gate roll coater, and making a consistency or less into 0.90 for the coating liquid which carries out 20-100 weight section content of the pigment whose oil absorption of this pigment is 50ml / 100g or less by calender processing.

[0007] Hereafter, this invention is explained in full detail. The pigment of the low oil absorption nature used by this invention means the pigment whose oil absorption by the approach of JIS-K5101 is specifically 50ml / 100g or less. Since a binder is consumed beyond the need and the reinforcement on printing falls with the pigment which has oil absorption [ good ] for 50ml / 100g, it is unsuitable. Moreover, since in the case of a high oil absorption nature pigment a binder is not necessarily alternatively distributed only over the part of the hole of a pigment, the front face of a pigment is also covered and the oil absorption nature of ink falls as a result even if it adds the amount of binders corresponding to it in order to maintain reinforcement, ink gloss and an ink set (fixable [ of ink ]) will be inferior.

[0008] the rate of combination of the above-mentioned pigment -- the total pigment 100 weight section -- receiving -- the 20 - 100 weight section -- it is the 50 - 100 weight section preferably, and the pigment of low oil absorption nature may be used combining independent or two sorts or more. Moreover, although the total oil absorption of the mixed pigment is not limited to 50ml / 100g or less when oil absorption combines with the pigment of the high oil absorption nature exceeding 50ml / 100g, the rate of combination of a pigment (50ml / 100g or less) needs to carry out [ oil absorption ] to more than 20 weight sections to the total pigment 100 weight section to the last. Oil absorption produces a problem in a printability which the rate of combination of a pigment (50ml / 100g or less) explained below in 20 weight sections in the top.

[0009] As a pigment which has this oil absorption, a calcium carbonate, a kaolin, clay, a satin white, titanium oxide, an aluminum hydroxide, a zinc oxide, a barium sulfate, a calcium sulfate, a silica, the activated clay, a lake, a plastics pigment, etc. are mentioned.

[0010] With use of the above-mentioned pigment, the rate of combination of a binder is very important. namely, oil absorption -- the 100 weight sections of a pigment (50ml / 100g or less) -- receiving -- a binder 10 - the 100 weight sections -- it is before and after 50 weight sections preferably. Under in 10 weight sections, if the fall of printing reinforcement is caused and the 100 weight sections are exceeded, an ink set not only falls, but it will fall to printing opacity. Generally, in this invention, since the reinforcement of a binder was based on the class of binder including the difference in molecular weight, although it was that there is nothing 1 this \*\*\*\*\*, although the reason was not found well, it found out that weight % rules over uniformly regardless of the class of binder, and resulted in this invention, when the coating liquid which uses a low oil absorption nature pigment as a principal component was applied by the gate roll

coater.

[0011] As a binder used for this invention, a styrene butadiene system, Vinyl acetate acrylic, ethylene and a vinyl acetate system, a butadiene methyl methacrylic system, Various copolymers, such as a vinyl acetate butyl acrylate system, polyvinyl alcohol, Synthetic system adhesives, such as a maleic-anhydride copolymer, isobutene and a maleic-anhydride copolymer, and an acrylic acid, a methyl methacrylate system copolymer, Adhesives generally known, such as natural system adhesives, such as oxidized starch, etherification starch, esterification starch, cold-water soluble starch obtained by carrying out flash plate dry cleaning of enzyme denaturation starch or them, casein, and soybean protein, are mentioned, and these may be used together.

[0012] Moreover, the various assistants blended with the usual pigments for coated paper, such as a thickener, a water retention agent, a deck-watertight-luminaire-ized agent, and a coloring agent, can use it suitably if needed. In this invention, the coating liquid which uses a pigment as a principal component is the liquid water was made to dissolve or distribute with a pigment, a binder, and other additives, and the concentration of a pigment, a binder, and other additives says 10 - 70% of the weight of a thing.

[0013] The gate roll coater used by this invention is the method of application which measures liquid by the imprint of the coating liquid during a roll combining two or more rolls, and is fundamentally imprinted in stencil paper, although the thing of various formats exists with the combination of a roll etc. Quality not only deteriorates, but it is easy to generate a pattern peculiar to a roll, and the gloss of a spreading side and smooth nature fall in the case of exfoliation after the imprint of a spreading roll side and stencil paper, and this method of application serves as a serious failure also at the time of printing. Since this inclination becomes remarkable with making liquid concentration or a spreading rate high, it needs to find out the optimal conditions in consideration of a surface condition.

[0014] Although the gate roll coater applying method which this invention performs is generally suitable for the operability in an on-machine coating machine (what the coating-machine section has connected to a paper machine) since equipment itself is comparatively compact compared with the blade coating-machine applying method or the Ayr knife applying method, this invention may not necessarily be limited to an on-machine, and an off machine is sufficient as it. The application constituent of this invention obtained in this way is applied to both sides thru/or one side of stencil paper, it is a dry weight standard and 2-5 g/m<sup>2</sup> coating is preferably carried out two or more [ 1g //m / per one side ].

[0015] It is mixed and used by the ratio of arbitration and the pulp constituent which added usual loading material, paper reinforcing agent and yield improver for paper manufacture, a usual sizing compound, etc. if needed is milled with that the waste paper pulp which deinks the newspaper, magazine, etc. containing a mechanical-pulp chemical pulp and these as stencil paper used by this invention, and is obtained is independent, or the usual paper machine which has a single wire or a twin wire.

[0016] In this invention, a gate roll coater performs calender processing for the above-mentioned coating liquid after spreading, and it is reached by making a consistency or less into 0.90. When a consistency exceeds 0.90, the fall of printing opacity is caused being crushed too much, and it leads also to a fall whenever upright. Furthermore, although ink gloss is high, not only a coating layer but the so-called set-off when it is

crushed to Hara paper at and ink cannot permeate easily is caused. Although the consistency was crushed more than 1.0 thru/or it by calender processing in many cases in order to take out gloss generally, in this invention, the combination which maintained balance with the porosity of pigment original and the adhesive property of binder original very much was establishable by finding out the optimal combination of a low oil absorption nature pigment and a binder. For this reason, it did not need to crush in a calender beyond the need and the good pigment coated paper for printing of ink gloss and balance whenever upright was able to be obtained by holding down a consistency to 0.90 or less rather.

[0017] On the other hand, when not performing calender processing at all, the fall of ink gloss is caused, since the spreading side is still coarser, a part of spreading layer imprints with a blanket at the time of printing, and the problem of the so-called clay omission that even a printing image influences in the end arises. For this reason, although the so-called no calender which does not perform calender processing is not included in this invention, and the self-weight and \*\* which are the minimum linear pressure of a calender do not apply, "the common-name S lap through" which lets two or more calendering rolls pass decides to include in this invention in order to polish a spreading side in a sense.

[0018] The calender processing used by this invention does not smooth data in a supercalender, a machine calender, etc., and especially the upper limit of a linear pressure specifically has 100 or less kg/cm desirable [ processing ], although it is not limited. Moreover, although not limited especially about the quality of the material, temperature, etc. of the number of nips, and a roll, you may satisfy 0.90 or less consistency which this invention specifies.

[0019]

[Function] In this invention, the coating liquid which coating liquid carries out 10-100 weight section content of the binder to the total amount 100 weight section of a pigment, and carries out 20-100 weight section content of the pigment whose oil absorption of this pigment is 50ml / 100g or less is excelled in ink gloss and print durability also with a low basis weight by making after spreading by the gate roll coater, and making a consistency or less into 0.90 by calender processing, and the pigment coated paper for printing with whenever [ printing opacity and whenever / upright / still higher ] can be obtained.

[0020]

[Example] Hereafter, although an example explains this invention to a detail further, this invention is not limited to this. In addition, each the section and % which are shown below are weight criteria.

[0021] By the gate roll coater, the coating liquid of the following combination was adjusted to the paper of fine quality of the basis weight (bone dry) of example 160 g/m<sup>2</sup> so that the coverage of a bone dry might serve as one side 3 g/m<sup>2</sup>, and double spread was carried out to it by part for 800m/in spreading rate.

<Combination> The 2nd class kaolin of - marketing (oil absorption of 50ml / 100g) : The 20.0 sections - marketing precipitated calcium carbonate (oil absorption of 70ml / 100g) : The 80.0 sections - marketing phosphorylation starch : The 5.0 sections - styrene-butadiene latex : The 5.0 sections - marketing polyacrylic acid system dispersant : The 0.1 sections - sodium hydroxide : The 0.1 sections, next this paper were processed by the supercalender (ordinary temperature, linear pressure 30 kg/cm, and 1 nip), and the pigment coated paper for printing of a consistency 0.75 was obtained.

[0022] Except making the 2nd class kaolin (oil absorption of 50ml / 100g) of marketing into the 50 sections, and making commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) into the 50.0 sections in example 2 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0023] Except making the 2nd class kaolin (oil absorption of 50ml / 100g) of marketing into the 100 sections in example 3 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0024] Except making the 2nd class kaolin (oil absorption of 50ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 15.0 sections and a styrene-butadiene latex into the 15.0 sections for the 50.0 sections and commercial phosphorylation starch in example 4 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0025] Except making the 2nd class kaolin (oil absorption of 50ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 50.0 sections and a styrene-butadiene latex into the 50.0 sections for the 50.0 sections and commercial phosphorylation starch in example 5 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0026] Except making the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing into the 20 sections, and making commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) into the 80.0 sections in example 6 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0027] Except making the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing into the 50 sections, and making commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) into the 50.0 sections in example 7 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0028] Except making the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing into the 100 sections in example 8 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0029] Except making the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 15.0 sections and a styrene-butadiene latex into the 15.0 sections for the 50.0 sections and commercial phosphorylation starch in example 9 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0030] Except making the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 50.0 sections and a styrene-butadiene latex into the 50.0 sections for the 50.0 sections and commercial phosphorylation starch in example 10 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0031] In example 11 example 1, the 2nd class kaolin (oil absorption of 30ml / 100g) of

marketing was made into the 50 sections, the 15.0 sections and a styrene-butadiene latex were made [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] into the 15.0 sections for the 50.0 sections and commercial phosphorylation starch, except changing supercalender conditions further (ordinary temperature, linear pressure 70 kg/cm, and 1 nip), it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0032] In example 12 example 1, the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing was made into the 50 sections, the 15.0 sections and a styrene-butadiene latex were made [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] into the 15.0 sections for the 50.0 sections and commercial phosphorylation starch, except changing supercalender conditions further (ordinary temperature, linear pressure 100 kg/cm, and 1 nip), it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0033] Except making the 2.5 sections and a styrene-butadiene latex into the 2.5 sections for commercial phosphorylation starch in example of comparison 1 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0034] Except making the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 2.5 sections and a styrene-butadiene latex into the 2.5 sections for the 50.0 sections and commercial phosphorylation starch in example of comparison 2 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0035] Except making [ the 2nd class kaolin (oil absorption of 50ml / 100g) of marketing ] the 2.5 sections and a styrene-butadiene latex into the 2.5 sections for the 100 sections and commercial phosphorylation starch in example of comparison 3 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0036] Except making the 2nd class kaolin (oil absorption of 70ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 15.0 sections and a styrene-butadiene latex into the 15.0 sections for the 50.0 sections and commercial phosphorylation starch in example of comparison 4 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0037] Except making the 2nd class kaolin (oil absorption of 70ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 50.0 sections and a styrene-butadiene latex into the 50.0 sections for the 50.0 sections and commercial phosphorylation starch in example of comparison 5 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0038] Except making the 2nd class kaolin (oil absorption of 100ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 15.0 sections and a styrene-butadiene latex into the 15.0 sections for the 50.0 sections and commercial phosphorylation starch in example of comparison 6 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0039] Except making the 2nd class kaolin (oil absorption of 100ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 50.0 sections and a styrene-butadiene latex into the 50.0 sections for the 50.0 sections and commercial phosphorylation starch in example of comparison 7 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0040] Except making the 2nd class kaolin (oil absorption of 50ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 65.0 sections and a styrene-butadiene latex into the 65.0 sections for the 50.0 sections and commercial phosphorylation starch in example of comparison 8 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0041] Except making the 2nd class kaolin (oil absorption of 30ml / 100g) of marketing into the 50 sections, and making [ commercial precipitated calcium carbonate (oil absorption of 70ml / 100g) ] the 65.0 sections and a styrene-butadiene latex into the 65.0 sections for the 50.0 sections and commercial phosphorylation starch in example of comparison 9 example 1, it is the completely same approach as an example 1, and the pigment coated paper for printing was obtained.

[0042]